

## VARIATION IN THE SKULL AND HORNS OF THE ISABELLA GAZELLE.

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Mr. George L. Harrison, jr., has recently presented to the United States National Museum eight skulls of male *Gazella isabella* Gray taken during 1911 in a limited area near Jebel Bawati, Nubia. Five are fully adults of essentially uniform age, with basal suture obliterated, permanent dentition in place, and posterior molar moderately worn. The others, also uniform in age, are considerably younger, with basal suture open, milk dentition present though much worn, and third molar not fully in line with other teeth. The individual variations occurring in these specimens seem worthy of special note.

*Skull.*—In general proportions the skull does not vary conspicuously (see table of measurements, page 172). Premaxillary in contact with nasal in five specimens, not in contact in two (lost in the remaining skull). The shape of its upper extremity ranges from broadly, almost spatulately, truncate to narrowly tapering. Nasals varying considerably in length (34–48) and in relative breadth (ratio of breadth to length ranging from 40 to 50), posterior termination of bones usually pointed, but broadly rounded in 173824; deepest point of emargination of anterior border lying distinctly on outer side of middle in four specimens, at middle in three (one broken). Lachrymal pits not noticeably variable in development; vacuity at least twice as large in No. 173822 as in No. 173824. On ventral aspect of skull the chief regions of variation are the auditory bullæ and the posterior termination of palate. The portion of bulla exposed on ventral surface of skull ranges from 23 by 12 to 27.4 by 17; height above level of basioccipital 4.6 to 6.8, least width of basioccipital between bullæ 13.6 to 17. (In the skull with largest bullæ the condylobasal length is 4 mm. less than in that with the smallest.) Posterior border of palate usually with median and lateral emarginations extending forward to essentially the same level, but in one adult and one young the median cleft runs forward about 8 mm. beyond the lateral concavities; deepest point of lateral concavities in adults ranging from about level of posterior border of  $m^3$  to middle of hinder lobe of same tooth.

*Horns*.—The horns of the adults vary conspicuously in robustness, in outline of cross section, in height to which the extremities rise above skull, and in plane occupied by the abruptly curved tip.<sup>1</sup> Most of these variations can be appreciated from the photographs in plate 15. Diameter of horn at base, 30.5 by 23.5 in No. 173819, 33 by 25.5 in No. 173822, these specimens representing the extremes. The cross section is usually flattened on the outer and posterior aspects, the region of juncture sufficiently abrupt to produce an evident angle or low rib extending from base of horn to beyond middle. In No. 173818 the flattening is very slight, while in No. 173820 it is practically absent, so that the section is broadly ovate in outline, wider posteriorly than anteriorly. The differences in the curves and general direction of the horns is sufficiently shown by the photographs of the six skulls which present the extremes of variation.<sup>2</sup> Though the abruptness of the curve at tip is subject to little variation, the plane in which the curved portion lies may be nearly horizontal, as in No. 173821, or nearly vertical, as in No. 173818. All intermediate positions occur, and in this respect there is often, as in No. 173825, an appreciable difference between the horns of the same pair.

Table of cranial measurements of *Gazella isabella*.

Number.	Sex.	Cranial measurements													Observations.
		Condylbasal length.	Upper length.	Zygomatic breadth.	Least interorbital breadth.	Breadth of palate including $m^2$ .	Breadth of brain case.	Depth of brain case.	Nasal (median).	Greatest combined breadth of nasals.	Maxillary tooth row.	Second upper molar.	Length of horn along anterior surface.		
173818	Male ad...	177.4	142.6	69.0	47.6	42.8	58.0	52.8	48.6	19.6	53.0	12.0 x 9.0	240	$m^3$ moderately worn.	
173819	...do.....	174.6	136.6	68.4	48.6	45.0	56.0	52.8	40.0	19.0	51.0	11.4 x 9.6	220	Do.	
173820	...do.....	178.4	140.6	67.0	46.6	43.2	59.2	54.6	41.4	19.6	54.6	12.6 x 8.8	238	Do.	
173822	...do.....	176.6	139.4	68.0	48.4	44.2	55.4	51.6	44.8	18.0	57.6	12.8 x 9.4	228	Do.	
173823	...do.....	177.6	136.4	67.6	47.4	42.0	56.6	50.6	39.2	19.0	54.6	12.0 x 8.8	225	Do.	
173821	Male juv.....	124±	65.0	44.0	43.2	55.8	50.0	32.0	15.6	57.6	13.0 x 8.0	180	$m^3$ not in place.		
173824	...do.....	166.4	134.4	62.0	42.0	39.8	56.4	51.4	42.0	17.8	55.6	12.4 x 8.0	168	Do.	
173825	...do.....	172.6	137.6	66.2	45.0	42.6	57.6	53.0	46.8	19.4	57.6	13.0 x 9.2	197	Do.	

#### EXPLANATION OF PLATE 15.

Skulls of six specimens of *Gazella isabella* (about  $x\frac{1}{3}$ ).

No. 1, Cat. No. 173822.

No. 2, Cat. No. 173819.

No. 3, Cat. No. 173823.

No. 4, Cat. No. 173818.

No. 5, Cat. No. 173825.

No. 6, Cat. No. 173821.

Note the progressive elevation of horns from No. 1 to No. 5. Plane of terminal hook nearly vertical in No. 4, nearly horizontal in No. 6.

<sup>1</sup> The abruptness of this curve, one of the main characters separating *Gazella isabella* from *G. dorcas*, is perhaps the least variable feature of the horns.

<sup>2</sup> All of the figured specimens are adult with the exception of Nos. 173821 and 173825.